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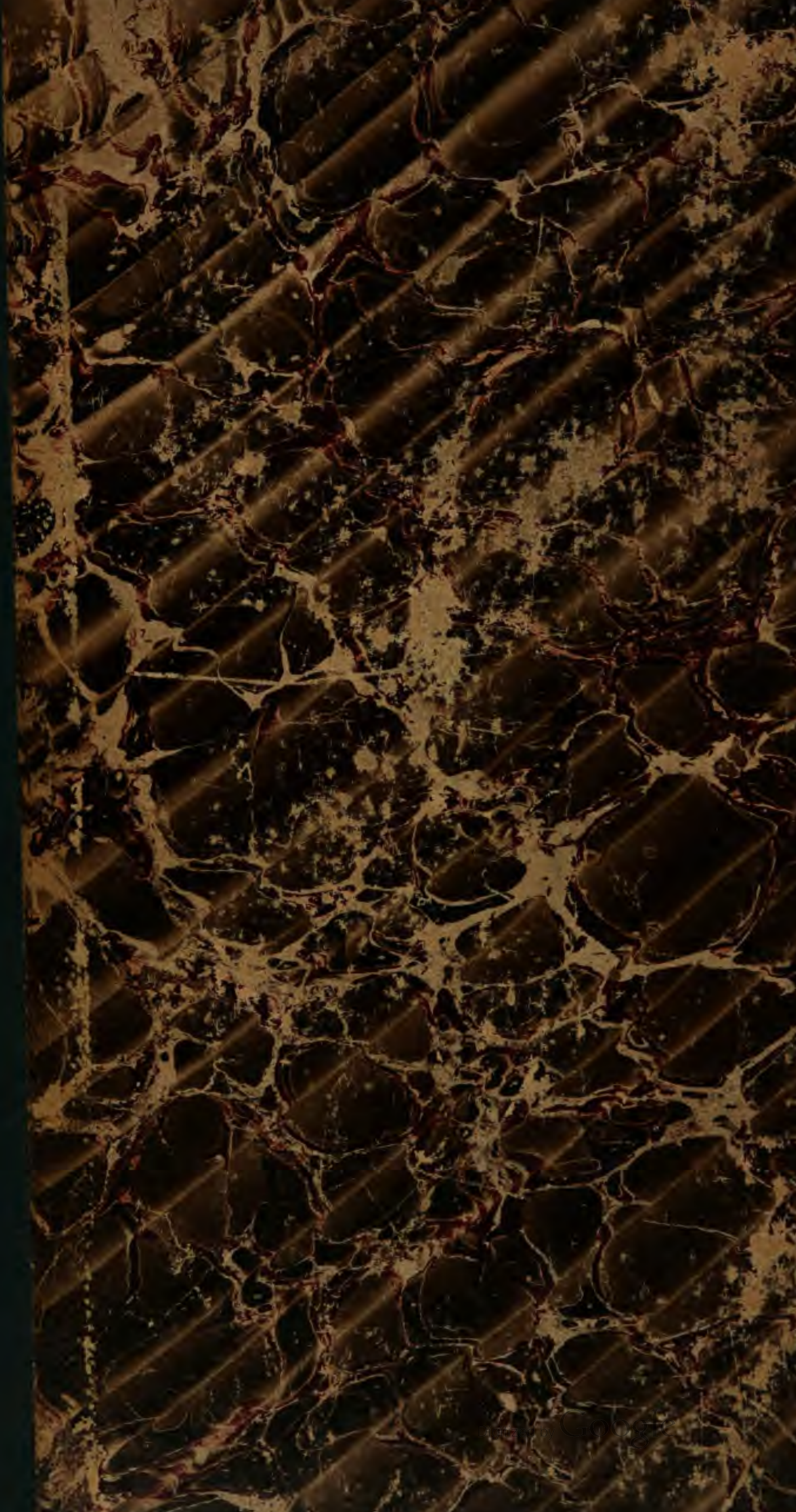

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NEW YORK:
1881.

New York Entomological Club,

MEETS TWICE MONTHLY.

A. R. GROTE, PRESIDENT.

BERTHOLD NEUMOEGEN, TREASURER.

HY. EDWARDS, SECRETARY.

PAPILIO.

Organ of the New York Entomological Club.

Vol. 1.] October, 1881. [No. 9.

AN AQUATIC NOCTUID LARVA.

Arzama Melanopyga Grote, new species.

BY PROF. J. HENRY COMSTOCK, OF CORNELL UNIVERSITY.

During the month of January, 1880, I found the larva of a Noctuid moth very common in the leaf-stalks of pond lily in Lake Beresford, Florida. The larva bores a hole from the upper side of the leaf into the petiole, which it tunnels in some instances to the depth of two feet or more below the surface of the water. The species was very common, a large proportion of the leaves of the lily in that lake being infested. There was, however, but a single larva in each leaf. When full grown the larva measures from 50 mm. to 70 mm. in length, and it is a little more than 5 mm. in diameter. The color of the dorsal surface is dark olive gray, and of the ventral surface pale olive gray; its head is light reddish brown. Some specimens are much lighter in color, being quite transparent. These larvæ are well known to the people living near the lake, who use them for fish bait, and call them "bonnet worms;" the term "bonnet" being applied to the large leaves of the lily.

From larvæ which I collected at that time and sent to Washington, two moths were reared. These were referred to Mr. A. R. Grote, who determined them as an undescribed species of *Arzama*, and kindly prepared a diagnosis of the species under the name of *A. Melanopyga* for publication in my report as Entomologist of the Department of Agriculture. As I was unable, for want of time, to prepare an article on the subject, I did not include Mr. Grote's description in my report. I now, therefore, in justice to him, hastily pen this note, in order to put on record his description, which I have already withheld too long.

I have recently found a larva in considerable numbers in the leaf stalks of our common yellow pond lily (*Nuphar Advena*) at Ithaca, N. Y., which I believe to be *A. Melanopyga*. These I have now under observation in aquaria in my laboratory. And I hope ere long to be able to give a detailed account of them. I will now briefly record a few of the more interesting points already observed.

The larva is furnished with nine pairs of spiracles, each of which, excepting the ninth, occupies the usual position. The ventro-dorsal diameter of the last segment is much less than that of the remainder of the body, this segment appearing as if the dorsal half had been cut away. The spiracles of the penultimate segment are situated in the dorsal part of the posterior end of the segment; which, on account of the peculiar shape of the last segment, is free. These spiracles are much larger than the others, and are doubtless the ones chiefly used while the larva is in its burrow. The position and direction of these spiracles remind us of the arrangement of the respiratory system in many Dipterous larvæ, which live either in water or masses of decaying matter. Frequently these lily-borers remain with only the caudal tip of the body projecting from the water, evidently using the posterior spiracles as just indicated. They can, however, descend below the surface of the water and remain there a long time. My observations on this point are limited, but I have seen a larva remain entirely under water voluntarily for the space of a half hour. The tracheæ of these larvæ are unusually large. May they not serve as reservoirs of air for the use of the insect while under water?

These larvæ are able to pass on the surface of the water from one leaf to another. This they do with a motion similar to that of a water snake.

Associated with the larvæ of *A. Melanopyga* in Florida, I found another Lepidopterous larva, a somewhat smaller insect, living more upon the surface of the leaf. This species I failed to rear to the adult state.

The following is Mr. Grote's description:

ARZAMA MELANOPYGA, n. s.

♀. Allied to *Vulnifica*, with very similar markings and color, but the thick anal tuft of the female is discolorous and black or blackish. Front unarmed, smooth. This character separates *Sphida Obliquata* from *Arzama Diffusa*, *Vulnifica* and *Melanopyga*. According to Mr. Butler, who has kindly examined Mr. Walker's type of *Arzama Densa* from Georgia in the British Museum, the type of the genus agrees in having the front smooth. The two genera are allied, but the characters of the clypeus are decidedly of generic value in the moths; upon these several genera are founded, and we can thus separate *Ochria* (Gortyna *Led.*) and *Gortyna* (Hydroecia *Led.*). Both *Arzama* and *Sphida* are internal feeders; the chrysalids of *Obliquata* have been taken in stumps under circumstances which lead to the belief that the larva may be a wood-feeder like *Scolecocampa.* The horned clypeus is evidently correlated with function in these internal feeders. In *Melanopyga* the thorax and forewings are dusky yellow; the stigmata concolorous; the lines oblique, uneven, the posterior line dentate, the median shade indicated. In color the lines are dark, with a reddish tinge; the terminal space shaded with dusky without the dentate subterminal line. In color this species is paler than *Vulnifica,* the abdomen more grayish. The hind wings are stained with reddish; in one specimen the border remains grayish. *Expanse* 40 mil. Two ♀ specimens reared by Prof. Comstock from larva boring in leaf-stalks of pond lily. I have a specimen of *Vulnifica* ♀, collected by Mr. Schwarz in Florida with pale anal tuft. I might be inclined to consider the paler color and black anal tuft varietal characters, but the transverse posterior line is less rounded and more acutely angulated below costa in *A. Melanopyga.*

A LITTLE BEAUTY FROM NORTHERN ARIZONA.

By B. Neumoegen.

Sphinx (Hyloicus) Dollii. n. sp.

Head light gray, with two black spots near antennæ. Antennæ brownish with light gray pectinations. Collar light gray, but thorax and patagiæ whitish gray, with two broad dark gray stripes along tegulæ, accentuated with black at their commencement at collar.

Primaries light gray shading off into whitish towards base. Costal edge darker gray. Fringes whitish with darker gray spots alternately at the intersection of the veins. A blackish dash from apex pointing diagonally towards base and fading away in discoidal veins. Two short blackish dashes between 1st and 2d and 2d and 3d median veins, parallel with the neuration.

Secondaries uniform brownish gray with fringes alternately dark gray and white.

Beneath uniform cinereous with the blackish trace of the apical, diagonal dash of primaries. Fringes as above.

Abdomen light gray, with a black dorsal line and black and white lateral intersections at segments.

Expanse of wings, 1.15-16 inch.

Habitat: Prescott.

Type ♂., Coll. B. Neumoegen. This little beauty is gratefully dedicated to my faithful factotum, Mr. I. Doll, who, undaunted by the strain of a torrid zone and the attacks of Indians, pursues his duty of collecting material for our Science.

See v. 11

DESCRIPTION OF THE PREPARATORY STAGES OF THECLA HENRICI, GROTE.

By W. H. Edwards.

EGG.—Shaped like that of *Lycaena Violacea*, flattened and depressed, about this depression the ridges are reduced and the surface is finely reticulated: but elsewhere there is a white frosting of peaks and ridges; color whitish green; this lace work seems to be separable, and in one case where the egg had been rubbed by a leaf, apparently, a film was turned up, and the real surface was seen to be delicate green. Duration of this stage, 5 or six days.

YOUNG LARVA.—Length, 4-100 inch; shape, oval; broadest anteriorly, the base flattened; dorsum high and sloping posteriorly; the summit of dorsum flattened for a little space, and on either side there is a row of long recurved white hairs; along edge of base is another row of similar hairs, bent down; color brownish yellow; head obovoid, and smooth. Duration of this stage, 5 days.

After 1st Moult.—Length, 8-100 inch; same shape; segments rounded, but on dorsum rather angular; a red-brown medio-dorsal stripe stopping at 12; on either side of this dull yellow-green, with a macular brown line next outer edge, and limiting the dorsal area; sides sloping a little incurved, red-brown, with a broken yellowish line; a similar but continuous line along basal ridge; whole underside yellow-green; body much covered on upper side with short, stiff, brown hairs; head cordate, smooth, yellow-green. To next moult between three and four days.

After 2nd Moult.—Length, 12-100 inch; shape as before; the dorsum is considerably elevated, a tuberculous ridge across each segment, from 4 to 11; color red-brown and dull yellow-green; a red medio-dorsal band, tapering to a point posteriorly; through the band runs a green line; outside this band is a green one, containing a little red-brown speck on each segment; sides red-brown, with a green longitudinal line in middle; basal ridge green. To next moult, 5 days.

After Third Moult.—Length, 3-10 inch; greatest breadth 12-100 inch; the dorsum from 4 to 11 presents a series of elevated ridges, one to each segment, narrow in front, broad behind; the summit of dorsum flattened and a little concave, and this is covered by a broad band, cut by a paler line; the remainder of the elevated ridges yellow-green, making a macular green band; sides sloping, nearly flat, red-brown, with an indistinct green line; segment 2 is a broad, elevated rolled collar, in which the head is concealed; 3 has a similar collar in front; basal ridge green, head yellow-green.

One day later, length 4-10 inch: the color has changed to port-wine red, the sub-dorsal area remained yellow-green, but was red-tinted on the posterior part of each segment; the sides same red; a pale red line along basal ridge; about the spiracle a little green; under side diluted wine color; body covered with short brown hair.

One day later, at 5-10 inch; greatest breadth, 19-100; width, 14-100; same color as on previous day.

Still one day later, length 56-100, same color, stopped feeding, and 4 days later fixed for chysalis. In about 24 hours it pupated, at 8 days after 3d moult (as observed).

CHRYSALIS.—Length, 3-10 in.; breadth of abdomen, 2-10, at mesonotum 13-100; height of abdomen 19-100 inch; oval at both ends; the abdomen distended, narrowing anteriorly; the mesonotum rounded and sloping to top of head case; the under side almost straight from end to end; color black or brown black, with obscure red bands; and being on either side a narrow black stripe in middle of abdomen; on mesonotum this stripe disappears and the red remains; whole surface finely corrugated; the dorsum and sides much covered with short hairs, and along the venter is a line of longer ones. The chrysalis will pass the winter.

On 17th of May, 1880, I happened to be standing under a wild plum tree near my house, and with no special motive reached out my hand and plucked a young plum. On this there appeared an onisciform caterpillar with head and some segments of body buried in the side. Feeling sure it was of some butterfly, I searched long for more larva, but found none. I did see one on the plums on another tree which had been partly excavated. This caterpillar was in the penultimate stage, as it turned out, and I raised it to chrysalis, always feeding on the inner part of the plum. The chrysalis died during the winter, and before any color came to the wings of the pupa, so that I had no clue whatever to the species or even the genus. I hoped it might prove to be *Fenesica Tarquinius*, but thought it was a Thecla; it might be *T. Poeas*, rather a common species here, and the food plant of which I had tried in vain to discover.

About middle of April, 1881, Mr. T. L. Mead visited me, and on several days brought in examples of *Thecla Henrici*, and confined some of the females on whortleberry and oak, the former suggested by Scudder's list of food plants, published in Am. Nat., 1869, but got no eggs. On opening one of these females the eggs were found fully formed. Finally it occurred to me to try wild plums, and the bag was tied over the end of a branch still in flower. No eggs were observed till the fourth day, when I found fifteen had been laid in a bunch, all but one at the base of a flower stalk, on the upper side. Although watching these carefully, the branch having been cut off and set in a bottle of water, they hatched when I was not at home, and all but six of the caterpillars were hurt by dropping off. The egg shells were eaten scarcely more than enough to permit egress. To prevent further loss I laid the young caterpillars on the floor of a tin box among some plums, and they soon found the stalks and climbed up. The plums were but just from the blossom and tender enough for so minute a caterpillar. Evidently the eggs are laid just at the right season for the caterpillars to seize the newly-formed plums. A little too early or a little too late might be fatal. So also the eggs are laid at just the right spot, on the bark at base of the stalk, and instinctively the little creatures ascend to their food. They grow with the plums, and when the caterpillars are matured the plums are of large size. The attack was made at once on the side of the plum and a hole was eaten out large enough for the head to enter, and thereafter the caterpillar spent most of its time with head in the cavity. I brought fresh plums as often as the old ones wilted, and transferred the caterpillars to them, but from one cause or other, probably from feeding in this artificial manner, all died excepting one. When a moult approached it came out of its burrow and rested either on the side of the plum or on the leaf. At one-quarter inch long, *i. e.*, when half grown, it seemed to have its head and shoulders buried at least from 6 A. M. one day till 9 P. M. the next, with no withdrawal observed by me, and I looked at it frequently. Cutting open the plum the excavation would be found reaching quite across and around the pulpy stone, which in the earlier larval stages was not eaten. But after 3d moult this was eaten and the entire plum excavated. In no case was the skin eaten except at the entrance. I placed damson plums in the box, but the wild ones were always preferred.

I am confident that the caterpillar of 1880, before spoken of, was of this species, although the color differed greatly. That was wholly green, in shades, except for two subdorsal brown stripes. The caterpillar of 1881 was port wine-red. But they were of same size, same shape, and the habits were precisely alike. In Lycæna *Violacea* some of the caterpillars are nearly white, some are green, and some are wine-red. Perhaps hereafter on raising a brood of the caterpillars of *Henrici* both red and green ones will be found.

The caterpillar of 1880 is described thus:

MATURE.—Length 5-10 inch; shape as of *Henrici*, color yellow-green, yellow predominating on the sides; the dorsal elevations have the summits yellow, the outsides greenish; the medio-dorsal stripe green, edged on either side by a brown line.

NOTE.—In my Catalogue, 1877, I gave *Henrici* as a marked variety of T. *Irus*. I am inclined to regard the two as distinct species, though nearly allied. Both are found here, and at the time Mr. Mead confined females of *Henrici* over whortleberry and oak, he treated *Irus* in same manner. Also, afterwards, I tried these over plums, but in no case were eggs obtained. Fresh specimens of *Henrici* are of a delicate yellow-green color beneath, and this fades somewhat soon after death.

PAPILIO.

Organ of the New York Entomological Club.

Vol. 1.] December, 1881. [No. 11.

ON CERTAIN HABITS OF HELICONIA CHARITONIA, LINN., A SPECIES OF BUTTERFLY FOUND IN FLORIDA.

By W. H. Edwards.

In part read before the Ent. Sub-Section of the Am. Assn., at Cinn., August 18, 1881.

In Wallace's Contributions to the Theory of Natural Selection, London, 1870, page 77, we read: "There is in South America an extensive family of these insects, the Heliconidæ, which are in many respects remarkable. They are so abundant and characteristic in all the woody portions of the American tropics, that in almost every locality they will be seen more frequently than other butterflies. They are exceedingly beautiful and varied in their colors, spots and patches of yellow, red, or pure white, upon a black, blue or brown ground being most general.

They frequent the forests chiefly, and all fly slowly and weakly. Yet, although they are all so conspicuous and could certainly be caught by insectivorous birds more easily than almost any other insect, their great abundance all over the wide region they inhabit shows that they are not persecuted.

It is to be especially remarked also that they possess no adaptive coloring to protect them during repose, for the under side of their wings presents the same, or at least, an equally conspicuous coloring as the upper side, and they may be observed after sunset suspended at the ends of twigs and leaves, where they have taken up their station for the night, fully exposed to the attacks of enemies, if they have any.

These beautiful insects possess, however, a strong, pungent, semi-aromatic or medicinal odor, which seems to pervade all the juices of their system. When the entomologist squeezes the breast of one of them between his fingers to kill it, a yellow liquid exudes, which stains the skin, and the smell of which can only be got rid of by time and repeated washings. Here we have, probably, the cause of their immunity from attack, since there is a great deal of evidence to show that certain insects are so disgusting to birds that they will under no circumstances touch them."

Mr. Belt, in "Naturalist in Nicaragua," p. 316, relates, that when in Brazil he watched a pair of birds catching butterflies and dragon flies, which they brought to their nest to feed their young, and in no case did they catch one of the Heliconidæ, which were in great numbers about, and could have been caught with less trouble than any others. Also, that a tame monkey, who was extremely fond of insects, and would greedily munch up any beetle or butterfly given to him, never would eat a Heliconian. There was no doubt from his actions that they were distasteful to him.

H. *Charitonia* is common in parts of southern Florida, and I am in possession of facts as to its habits through a correspondent, Dr. Wm. Wittfeld, a physician, resident at Georgiana, Indian River.

The eggs are laid on the tenderest terminal leaves of passion-vine. The caterpillars are conspicuous in color, being in the middle stages greenish white, and in the last stage dead white, like porcelain. They are furnished with long black spines, on the vertices of head as well as on body.

The chrysalis is a singular and remarkably pretty object. From the top of the head case proceed two long foliaceous divergent processes, and on the dorsal side of abdomen are broad and thin processes tipped with sharp thorns. The color is brown in shades, with some yellowish, and with burnished gold spots.

The butterflies live in the forest and fly along the paths, but they come into the open in the heat of the morning and return towards night, finding roosting places on Spanish moss and on dead twigs or branches, especially such as have dry leaves still hanging. Here they collect up to the number of seventy or even more.

The caterpillars, after third moult, at which time they become quite conspicuous in color, conceal themselves during the day.

Nothing appears to have been published of the preparatory stages of *Charitonia*, although it is a common species in Mexico, Central America, and some of the West India Islands. I deem myself fortunate, therefore, in having secured drawings of every stage for a plate in the "Butterflies of N. A." I have received young caterpillars, at Coalburgh, sent through the mails by my friend, and have raised them to chrysalis and imago.

Dr. Wittfeld, some time ago, called my attention to a strange habit of these butterflies, as follows: "On May 28th, I observed three *Charitonias* on a chrysalis of same species in the woods. They were firmly attached, and on trying to drive them off they would not go. I tried repeatedly, and finally used force. But after flying around a few times they took up their former position, heads down.

The next day the same thing occurred, only I noticed that one butterfly at a time would leave to feed; force was again used, with the same result as before. The following day, shortly after dawn, only a trifle of empty shell remained.

This observation prompted me to raise another chrysalis, which I suspended in a flowering shrub, which *Charitonia* frequented, June 27. Soon some butterflies came and touched the chrysalis, but its wriggling seemed to cause them to move off. Two days before the imago was due, they attached themselves again, two or three at a time, and would only yield to force, always returning. On the third day, at daybreak, only a trifling bit of the empty shell was left, and the butterflies were all gone." Dr. Wittfeld adds, "Did they come to protect the chrysalis or to assist the butterfly to come forth, or was there anything of sexual desire?"

I replied to this, asking how the butterflies attached themselves. Did they actually rest on the chrysalis, holding on by the legs? Also, was I to understand by bits of empty shells remaining that the imagos had come from the two chrysalids? I suggested, if this last was not what he meant, that, perhaps, the butterflies had discovered that the chrysalids were dead and decaying and came to seek the fluids as they come to carrion.

On this Dr. Wittfeld again writes: "In each case the butterfly emerged from the chrysalis. The chrysalis looked natural but was growing darker, and the day before the emerging, the coming live insect could, to some extent, be distinguished. There was nothing dead or decayed or partly eaten about it. All the legs of the guarding butterflies had firm hold of the chrysalis, and it required a little effort to remove them with the fingers. They sat firmly, not lightly upon it. To frighten them off did no good, it required force to remove them. After having been picked off they did not stay long away, but flying around a few times, (I having removed to some distance), returned to the chrysalis and attached themselves to it just as they had done before."

This is explicit. May there not be here a case of intelligent protection of the unborn butterfly by other individuals of its species? The butterflies themselves are protected, as we read, by their obnoxious smell and taste, or both, from birds, lizards and other animals, and the chrysalis might be just as obnoxious after it was seized. But, its color or appearance would not be sufficiently well known for its protection, and at the time when it was least able to take care of itself. To be sure, the chrysalis may, in a measure, protect itself by wriggling about, and by the squeaking noise which we read in books the chrysalids of the Heliconidæ make when alarmed, and which Dr. Wittfeld informs me he had noticed in the case of *Charitonia*. But when the pupa-case was softening, and the immature imago was in condition to receive injury by any rough attack, apparently the friendly neighbors gather about it and cover it unceasingly till the danger is past, and the butterfly emerges.

The foregoing recital led to some discussion by members of the sub-section, and it seemed to be rather the prevailing opinion that the immediate cause of the gathering of the butterflies about and on the chrysalis must be sexual. Much was said about the attraction of males of the Saturnidæ by the females, but this is excited by the females at large, not encased in pupa. It was doubted by some members if any odor could emanate from the imago of a moth in pupa, or of a butterfly in chrysalis, hermetically sealed up, as it were. Further observations were desirable.

After returning home from Cincinnati, I wrote Dr. Wittfeld, urging him to try again, and especially to ascertain whether the free butterflies and the imago in the chrysalis were always of opposite sexes or not, and whether females were attracted to a chrysalis in any case. I have his further report, as follows;

"With regard to the chrysalis found May 28, of which I wrote you, I add, that there was found by me on the ground, on the morning the butterfly emerged, a female with wings but partly expanded, yet paired with a perfect male. Also, when I discovered that the butterfly had come from the second chrysalis, that of June 27, I found a similarly undeveloped female on the ground near by, paired with a free male. I lifted both and placed them on a twig. The male flew off in course of two hours, but the female remained, though a cripple and unable to move.*

"After receiving your letter, for a long time I could obtain neither eggs nor caterpillars of *Charitonia*, but at last, near the end of September, I hung out a chrysalis. A heavy rain storm setting in, no butterflies were flying that evening, and next day, six A. M., I found the empty shell of the chrysalis and imago. On Oct 1, I suspended another chrysalis. Soon a number of of butterflies appeared, flying around and touching it. None however attached themselves to it as in previous observations. I caught one after another of these butterflies, as they came, and put them in a bag. About eleven o'clock, the imago came from the chrysalis, and as it clung to the empty shell, an occasional free butterfly would alight by it or fly about it. On examination this imago proved to be a male, and so did the captured butterflies.

At the same time another chrysalis was suspended, and began to change color, October 4, early in [the afternoon. Soon male butterflies appeared, took hold of the chrysalis, as before, but were easily frightened away.

---

* As Dr. Wittfeld had not mentioned these facts in his first accounts, I conclude that he did not then understand the relation between these crippled females and the imagos in the chrysalids, as he afterward learned to.

By six o'clock, same afternoon, the color had changed, and males came freely, attached themselves firmly, and would not let go, in fact, were utterly regardless of their safety. When picked off they would fly around and return at once. Two males remained all night. Before daybreak next morning, I was at my post, and there found the two males, opposite one another, head down, abdomen curved toward the abdominal end of the chrysalis, both apparently exercising a pressure. Lighted matches held near them would not drive them off, shaking the twig did not loosen their hold, only picking them off bodily separated them from the chrysalis. The latter was now almost black, and momentarily I expected the shell to burst. This happened, but the break was not at the usual place. Owing probably to the pressure or weight of the butterflies the shell burst at the abdominal end, and *instantly one of the males made connection with the female imago, while the head and thorax of the latter were still enclosed in the shell.* After about ten minutes, I determined to free the new insect, which was accomplished by a slight pressure on the shell, and I then removed the pair and suspended them to a leaf-stem. The wings of the female immediately began to expand, but they did not fully develop. Without my aid, the imago would not have been able to extricate itself from the shell, although copulation had been affected.

I suspended another chrysalis, well discolored, under same conditions, October 7, in the morning. Males flocked around the chrysalis, circled about a few times, approached closely and then flew off again, none having alighted or actually touched the chrysalis. This went on for an hour, when a male emerged. The butterflies were mostly caught and all proved to be males.

October 17, another chrysalis was suspended under same conditions as the last mentioned. Males appeared, etc. Behavior just as before; none touching. The imago proved to be a male.

It seems to me that the sexual odor is but faintly developed when first discoloration takes place, and hence the chrysalis draws the males but little, but as the color changes the odor developes rapidly, so that males flock to the chrysalis from different directions."

On November 1, Dr. Wittfeld again writes, "To-day I made another corroborative observation on Heliconia chrysalis. At eight A. M., 2 ♂♂ attached themselves to female chrysalis, and acted as before reported. Four more males had appeared by nine o'clock, took hold as best they could, and the six made quite a bunch. Soon after others came, but had to be content with flying in close proximity, as there was no more holding room. At ten o'clock, I freed the female from the crowd, and found the abdomen exposed, but head and thorax still in the shell. I observed that the abdomen was torn so that the contents were somewhat protruding.* I carried her to the house, allowed her to suspend from a branch, and being now out of the shell, the wings soon grew, and in another hour or so, the wound was healed or dried, and the insect flew off.

Though I have seen many Agraulis *Vanillæ* copulating, I don't remember of ever having seen H. *Charitonia* do the same at large. This prompts me to propose the following question; does this species ever pair in the ordinary way, after both sexes are fully developed, or do the males hunt the females while still in chrysalis? My late observations have brought me into all sorts of places, chiefly where passion-vine runs over dense bushes. There I have made frequent captures and have found all taken to be males. I believe the males were in search of a chrysalis. The females are mostly flying where the leafy parts of the vine are, while the males are where the chrysalis would be likely to be found, some distance off or below."

Dr. Wittfeld's admirable observations settle this; that in H. *Charitonia* the males are able, by some means, to distinguish the presence of a female in chrysalis, from the time when discoloration of the shell commences, that the attraction becomes stronger as the imago nears its emergence, that the females show no such attraction toward a male in chrysalis, and that males do not attract males. Incidentally, the female chrysalids would seem to be thoroughly protected against birds and other animals, but the protection, apparently, is purchased at a dear rate, if the female insect is liable to bodily injury or to be left crippled in wing. The last question propounded by Dr. Wittfeld, no doubt, he will in time be able to answer.

As I have elsewhere stated (Can. Ent. xiii, p. 208) it is not unusual to find female butterflies so lately out of chrysalis that the wings are at least limp, coupled with perfectly developed males, but I have not myself observed a case where the connection took place the instant the female broke from its shell, or before the wings were expanded. Certainly I have never known of male butterflies watching the advent of a female one moment, much more, for hours and days, and do not remember ever to have read of such an occurrence.†

November 11, 1881, discovered two chrysalids of *Charitonia* on the same plant, about two inches apart, but as much as two feet from the nearest passion vine. No. 1 was not discolored, No. 2 was a little discolored. To each chrysalis two males were attached. They would let go when touched, those on No. 2 hesitating a little; however, they all would return at once. On both chrysalids I noticed that the bodies of the males were bent up, that is, off from the chrysalis, and the pressure excited in former observations was not yet applied by the males. Apparently the males simply kept hold so as to be on hand when things developed.

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* I take it that copulation had been effected and that the torn appearance was caused by the forcible removal of the male. W. H. E.

† NOTE—After the foregoing pages were sent to the printer, I received from Dr. Wittfeld a statement of further observation, as follows:

Nov. 12, No. 1 is forsaken. To No. 2 four or five males cling, head down, bodies still bent up. They leave only to feed.

Nov. 13, No. 1 still forsaken, but in course of the day males flocked to it, their bodies still bent up. Were frightened away readily.

Nov. 14, No. 1 had all the attention of the males, while No. 2 remained forsaken, the bodies now touching the chrysalis, but almost midway of the abdomen of the pupa, not at the extremity.

Later. Two males had taken firm hold, as in previous obser vations, touching at the end of abdomen of pupa; would not let go, but had to be picked off.

Later. I found a pair in copulation on the ground. Now I examined No. 2 and found the imago nearly developed, but dead, and this explains why the chrysalis was forsaken.

During this observation I noticed that the males would alight on the chrysalis as they do on flowers, then wheel around quickly, head down, body up.

Nov. 14. My attention was attracted by a flock of six or eight *Charitonia* butterflies on the edge of woods, flying around an object which, on inspection, I found to be a chrysalis.

SOME REMARKS UPON THE CATOCALÆ, IN REPLY TO MR. A. R. GROTE.

By Geo. D. Hulst.

I notice in No. 9, Vol. I. of "PAPILIO," some strictures by Mr. A. R. Grote upon myself and an article written by me upon the Catocalæ of the U. S., and published by me in the Bulletin of the Brooklyn Ento. Soc., Nos. 1 and 2, Vol. III.

Following Mr. Grote in his remarks upon the article, I reply as follows:

It is substantially charged that in the article I was but the mouthpiece of Mr. Strecker; that he was the author or inspiration of the determinations made. I am able to prove by Mr. Strecker's letters to me at the time that he was not the suggester or inspirer of the article, nor the author of its ideas; and, moreover, that in one way or another he did not agree with me in my determination concerning the following Catocalæ: *Belfragiana, Alabamæ, praeclara, Atarah, abreviatella, Whitneyi, illecta, Bunkeri, Snowiana, perplexa, Meskei, vidua, Sappho, residua, Angusi and Mariana*—16 in all. He consequently did not so nearly agree with me as did Mr. Grote.

In giving my judgment upon the names in dispute between Messrs. Strecker and Grote, I decided upon the following evidence. While these gentlemen are principals in interest in this matter, they are not principals in evidence. Priority in names is based upon priority of publication. I accepted against Mr. Strecker, Mr. Grote's admission that Part XI. of Mr. Strecker's work was distributed Nov. 10, 1874. Had there been any necessity I would have demanded evidence from the publisher Mr. Strecker employed. Mr. Grote's descriptions were published by the American Ento. Soc., of Philadelphia, through Mr. Chas. A. Blake, its curator. Mr. Strecker, hearing I was about to publish the catalogue, wrote me a long article founded on letters received by him at the time from Mr. Blake, showing from these letters that Mr. Grote's names were not published in any way before Nov. 10. I told him, by letter, I would not receive that as evidence, unless Mr. Blake gave it his personal endorsement, and thus, as the agent of the Society, gave its declaration as to the time of publication. The papers were taken to Mr. Blake, and he, on the back of Mr. Strecker's argument, wrote as follows: "After going over all the data and correspondence between Mr. Strecker and myself, and carefully comparing dates from my own postal cards and letters to him in regard to the time proofs were sent to him (Mr. Strecker), it appears that Mr. Grote could not have received his "author's proofs" of his paper bearing date September, 1874, till after November 10, 1874, as there was no final corrected proof issued on that date yet. The matter on the other side of this, I find after going over carefully with the data at hand, is perfectly correct, so that if you want to use the name of Strecker after the species of Catocalæ in dispute, do so.

CHAS. A. BLAKE."

After my article was published, Mr. Hy. Edwards found some letters written him by Mr. Strecker at the time, which showed that Mr. Strecker's descriptions were not as yet written early in October, 1874. Of the existence of the letters neither Mr. Grote nor myself knew at the date of my publication. But from them it becomes certain that Mr. Strecker ante-dated Part XI of his work; and the two gentlemen in Brooklyn who told me they saw his proof sheets in August, were mistaken. These gentlemen are persons whose word any one would have taken without dissent. I told Mr. Grote I would publish the fact of Mr. Strecker's ante-dating, but he demanded that with that I should say the species were his, which, of course, I could not. I offered to publish the fact in the *Bulletin* of the Brooklyn Ento. Soc.; but as the fact did not affect the priority, the editor refused to allow it as it might tend to create confusion. Mr. Grote undoubtedly had his names first in MSS. Mr. Strecker undoubtedly had his first published. The date—September, 1874—on Mr. Grote's paper is the time it was received by the American Ento. Soc., and perhaps went to the printer—but the printer was slow, and Mr. Strecker got ahead in the race. When Mr. Hy. Edwards, acting as the advocate of Mr. Grote, came with his letters to a meeting of the Brooklyn Ento. Soc, (this was after my catalogue was printed) to show me how unfounded was Mr. Strecker's claim, I showed him my evidence, which astonished him. I asked him whether with the evidence I could have decided otherwise, and he answered, emphatically, "No." I am aware Mr. Edwards yet gives the names to Mr. Grote, but he does it on the basis that probably Mr. Grote's proof sheets were first run off, and anything printed, though uncorrected and undistributed, is publication. I do not look at publication in that light, and decide otherwise.

I do not prefer the name *Amestris* to the name *Anna*. Any one looking in Staudinger's Catalogue at the names of the Catocalæ of the European fauna, and over a catalogue of the names of our own species, will see that the names run almost universally in certain lines. "*Levettei*," though from the name of a gentleman of worth and ability, is not in either of those lines of names. And that name is the only one I referred to when I said Mr. Grote's names were not all Catocaline, as Mr. Grote knew when he wrote. Furthermore, *Amestris* was not named in honor of Swinburne's heroine, any more than Mr. Grote's *Anna* was named in honor of the prophetess of that name.

Concerning the position and specific worth of many so-called species, each student has a right to his own opinion. I followed in the catalogue the definitions laid down by me in the introduction, and in so doing followed Drs. Le Conte and Horn in the Coleoptera, Dr. Staudinger, in his catalogue of the European fauna, and Dr. Packard in his Geometrid Moths of N. A. And, while in some respects my opinion has changed, in the main I see no reason to doubt the substantial correctness of my catalogue.

Mr. Grote says, "it was a happy stroke and worthy of the disciple of Mr. Strecker to refer *semirelicta* as a var. of *unijuga* and remove *pura* to some distance as a distinct species." If Mr. Grote will refer to the catalogue he will see *semirelicta* is a var. of *Briseis*, not of *unijuga*. In the determination of *semirelicta* I had the advantage of both the literature and type of the species and am not in the minority in my judgment of its specific value. I put *Beaniana* where, from the "literature on the subject," I thought it ought to belong, and *pura* is next. If *Beaniana* is not in its proper place, *pura* certainly is, unless, as I think now, it ought to be put before *Briseis* rather than after.

Cœlebs is a good species. Mr. Strecker was responsible for the catalogue determination as was stated in the catalogue, and it is the only thing for which he was responsible. It is true, however, he still says, that he was misled by dark specimens of *Badia* identified by Mr. Grote as *Cœlebs*. Mr. Grote, if such gross lack of appreciation be allowed me, is not absolutely beyond such mistakes. He once upon a time identified many of the Heterocera for me, receiving therefor my written and substantial thanks. Among the insects sent were two Catacolæ. One a typica lspecimen of *Aspasia*, the other the type of *pura*, a description of which was already written. I desired thus to get Mr. Grote's unprejudiced opinion, and learn whether the former was his *Arizonæ*, and the latter his *semirelicta*. Mr. Grote actually sent the former back labelled "*Walshii*," and the latter "*Faustina*." Is it possible he had never "studied the literature upon the subject? Is it possible he did not know he had written a description of *Arizonæ*, to which he could refer? Is it possible that he did not know Mr. Strecker had written a description of *Faustina*, and had given a colored figure of it so excellent that the merest beginner could have known *pura* was not *Faustina*? Is it possible that he did not know he had the type of *semirelicta* in his cabinet, and was he ignorant of the "literature upon that subject" also? These facts throw some "light" upon Mr. Grote's claim that Mr. Strecker's *Aspasia* is his *Arizonæ* and that my *pura* is his *semirelicta*.

It is said I turned the sequence of the species upside down. I did, and gave as a reason for it that the yellow under winged species seem to follow more naturally after *Leucanitis* and *Parthenos*, and the dark under winged species glide more naturally into *Spintherops*. Can any one give a reason for the contrary arrangement except that Dr. Morris began it?

Mr. Grote's article and argument are largely made up of personalities. Upon these I have nothing to say. American lepidopterology has been disgraced in the eyes of the world, in the past, by such things. I will not be a willing party to the continuance of the disgrace. It is something for thought that my friend, Mr. Grote, has almost without exception had a part in all personal disputes, and has generally been plaintiff in those in which he has had part. It is certainly time the method was abated.

NOTE BY THE PUBLICATION COMMITTEE.

It is a subject of great regret to us that anything like personalities should have crept into the columns of "PAPILIO," but Mr. Grote's article having been printed during the absence of the editor from this city, it appeared to be only "fair play" to allow Mr. Hulst the opportunity of reply. As far as this journal is concerned, the matter will end here, and no further personal remarks will again be permitted in its pages.

A NEW VARIETY OF CATOCALA.

BY G. H. FRENCH, Carbondale, Ill.

CATOCALA ROBINSONI. *Grote*.
Var. *Curvata*. n. var.

In this form the ground color is a little brighter gray and the markings are a little more distinct than in the usual form. The distinctive features are a prominent black basal dash extending from the base of the primaries beyond the t. a. line, and a curved shade of the same from the costa at the place of the beginning of the median shade to the outer margin below the apex. I have several specimens of *Robinsoni* in which there is a faint trace of the subapical curve, but only a trace, and no others with even a trace of the basal dash. Expanse 1.35 inches.

Described from one ♀ taken here.

NOTES ON "THE TORTRICIDÆ, TINEIDÆ AND PTEROPHORIDÆ OF SOUTH AFRICA, LORD WALSINGHAM, M.A., F.Z.S.," &C.

BY C. H. FERNALD.

The above is the title of an interesting paper by Lord Walsingham on some of the microlepidoptera of South Africa, published in the Transactions of the Entomological Society, 1881, Part II., with four uncolored plates.

I do not feel competent to review this valuable paper, since most of the species are entirely unknown to me, but I wish to express the opinion that his Lordship has done a most praiseworthy work in clearing up the synonymy of the various writers on the micros of South Africa.

Lord W. found a single female in this collection, which agreed with the description of *Eccopsis Wahlbergiana* Zell., the types of which are in the museum at Stockholm. The genus *Eccopsis* was established by Prof. Zeller in 1852, for the reception of this species. In 1859, Lederer, in his classification of the *Tortricidæ* of Europe put the well known European species *latifasciana* Haw., into the genus *Eccopsis*, and this had been followed by later German writers down to the year 1875, when Zeller published his work on the *Tortricidæ* of North America, in which he expresses a doubt whether *latifasciana* is congeneric with his *Wahlbergiana*. Clemens had previously (1860) established his genus *Exartema* for *nitidana* and several other species, but in 1865 he suppressed this genus and put the species at first placed in it, in the genus *Sericoris*. Zeller, in the paper above referred to, revived the genus *Exartema* of Clemens and restored the species formerly placed in it, with some which he described as new. Zeller's original description of the genus *Eccopsis*, while agreeing with *Exartema* in general, did not mention the remarkable appendage near the anal angle of the hind wing of the male, and he did not think it possible that he could have overlooked it when he was characterizing his genus *Eccopsis* if it had really been present. Lord Walsingham has taken the trouble to determine the fact that such an appendage exists, and publishes a sketch of the hind wing of *E. Wahlbergiana*, made by Mr. C. Aurivillius, assistant in the Entomological Department of the State Museum at Stockholm, where the types are preserved. This sketch shows the venation and the characteristic appendage at the anal angle of the hind wing. The form of the anal angle beyond the appendage is subject to some variation among the American species, but the sketch of *Wahlbergiana* agrees very closely with *Eccopsis Footiana*, and differs but little from *nitidana*, the type of Clemens' genus *Exartema*.

From the North American species now before me I am sure we cannot regard a certain amount of variation in the form of the wing, of generic value. I believe then that we are justified in regarding Clemens' genus *Exartema* equivalent to *Eccopsis* of Zeller, and our species should be referred to the latter genus.

NOTES ON SOME NORTH AMERICAN LEPIDOPTERA.

By **Arthur G. Butler**, British Museum.

GEOMETRITES.

It appears to me that no group of moths has got into greater confusion than the *Geometrites*, and I strongly suspect that the principal cause must be sought for in in the want of definition in this part of the work undertaken by M. Guenée; whether that eminent Lepidopterist was in a hurry to get through his work, or whether the publisher worried him, I do not care to inquire, but he certainly failed to distinguish between reliable and variable characters; and, worse than that, he failed to separate the species before him into natural groups; by this I mean to say that having characterized a genus as possessing primaries with the outer margin angulated, M. Guenée was as likely as not to place in it half a dozen species not possessing that character; whereas, according to description, he ought to have placed them in a succeeding genus.

As this uncertainty in the outline of species primarily referred to a genus has led to different authors forming entirely dissimilar views in accordance with the named types in their collections, the evil has naturally increased tenfold since the publication of M. Guenée's work, and the consequence has been a great multiplication of synonyms.

The following Geometrites have been sent to us by Mr. H. Edwards:

ENNOMIDÆ.

Eŭtrapela falcata. *Packard.*

Two examples exhibiting different color variation from the Sierra Nevada. The genus is confounded with *Chœrodes*, *C. transferens* of Walker being the same as *E. clemataria*, a blunder due to the vague description,—"*les premières à apex aign et à bord terminal droit ou coudé en angle sur la* 2," a door being thus opened for the introduction by M. Guenée and all subsequent authors, of species utterly unlike in outline of wing.

Opisthograptis sulphuraria. *Packard.*

Two examples from California: it comes near to nothing in the museum series.

"Endropia madusaria. *Walker.*"

The species sent under this name seems to me to be the *E. effectaria* of Packard's Monograph; it certainly is not Walker's species (which seems to me to be the same as that figured by Packard), but comes nearer to *E. pectinaria*, *tigrinaria*, *astylusaria* and *propriaria* of Walker's list.

METROCAMPA PERLATA. *Guenée.*

From Vancouver Island and Colorado; it is also in the museum from New York: it is very close to the European *M. margaritata.* Is it really distinct?

TETRACIS AURANTICARIA. *Packard.*

An example from California; it is new to our collection.

TETRACIS PARALLELIA. *Packard.*

A specimen from Sierra Nevada; this is also new to us.

TETRACIS TRUXALIATA. *Guenée.*

Sierra Nevada, California; new to us.

TETRACIS ŒGROTATA. *Guenée.*

Under this name Mr. Edwards sends us two examples, one from Saucelito, California, of a pale, sandy reddish tint, with a feeble pink gloss and with distinct grey stripes connecting the black nervular spots; excepting that it is rather smaller and of a deeper color, it hardly differs from *Sabulodes dositheata,* Guen. which we have from Rio de Janeiro. The other specimen is from San Francisco, is of a paler, sandy yellowish tint, with the grey stripes much less defined. We received a still paler, although very similar form some years ago under the Ms. name of *Chærodes punctata,* Pack. I should say that it is undoubtedly conspecific with *Sabulodes colombiata,* Guen., two examples of which we have from Venezuela, and also with *Chærodes subclararia* and *C. atropesaria,* Walk.

AZELINA HUBNERARIA. *Guenée.*

Two examples from Havilah, and Sierra Nevada, California. They are larger and redder than our specimens and the line across secondaries is less defined; their general coloration is that of *A. nerisaria.* These California specimens exhibit more clearly than I have hitherto seen it, the peculiar pouch-like opening on each side of the abdomen at its base. What is the use of this contrivance?

IDÆIDÆ.*

"ACIDALIA" QUINQUELINEATA. *Packard.*

Two specimens from Nevada. The species belongs to the group *Idœa* of Treitschke. The numerous forms associated under the name of *Acidalia* will have to be distributed into smaller and less heterogeneous groups.

"ACIDALIA" CALIFORNIATA. *Packard.*

Two specimens, California.

To associate this little rounded-winged species with the preceding is most painful, and in the face of the closely related genera of the family *Ennomidæ* seems ridiculous in the extreme. It is probably congeneric with *A. rubricata* of Europe and might be placed with it under *Emmiltis* of Hübner, though its body is somewhat broader than that of the European species.

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* I suggest this name to supersede *Acidaliidæ* since the name *Acidalia* was first applied to a group of *Argynnides.*

FIDONIIDÆ.

LOZOGRAMMA TRIPUNCTARIA.

Thamnonoma Tripunctaria. Packard.

Sierra Nevada, California.

It is incomprehensible to me why Dr. Packard should have referred this species to *Thamnonoma* (*Halia* auct.); its close affinity to *Lozogramma petraria* of Europe and *L. defluaria* of Nova Scotia must, I should think, be admitted by all who compare the three species; whereas the typical form of *Thamnonoma* is more nearly that of *Macaria*. *L. extremaria* seems to come nearer to *Aspilates? ordinata:* an example (much worn) of *T. marcescaria*, also in this series, has more nearly the character of the genus.

PHASIANE IRRORATA. *Packard.*

Sierra Nevada, California.

Allied to "*Aspilates*" *arenosa* of Natal and *A.? irradiata* of Shanghai, which will certainly have to be placed in the same genus with it.

SELIDOSEMA JUTURNARIA. *Boisduval.*

Sierra Nevada, California: unlike any species known to me, perhaps nearer to *S. sordida* of Japan than to anything else in our collection.

SELIDOSEMA JUTURNARIA. VAR. CALIFORNARIA. *Packard.*

Sierra Nevada, California. It appears to me that this insect ought to be regarded as generically distinct from the preceding; its more compressed and therefore more slender antennæ, less deflexed palpi, narrower primaries, upon which the subcostal branches are crowded together, and distinctly narrower secondaries seem, apart from the general aspect, which is palpably different, to warrant their separation.

EUASPILATES SPINATARIA. *Packard.*

Colorado. The genus appears to me to be identical with *Conchylia*, Guenée (1857); but the latter falls before *Conchylium*, Cuvier (1817) and *Conchylis*, Sodoffsky (1837).

LARENTIIDÆ.

RHEUMAPTERA BRUNNEICILLATA. *Packard.*

South California. We have nothing near to this species.

" GLAUCOPTERYX CÆSIATA. *Hübner.*"

Two specimens, Havilah, California. This is not the European *G. cæsiata*, the latter has the outer edge of the broad belt across the primaries regular and dentated, whereas this species is more like *G. Kollariaria* with a regular sinuated band. I doubt the occurrence of G. *cæsiata* in America, although Packard's figure looks rather like the species: it is probable that the insect now before me is undescribed.

EPIRRITA 12-lineata. *Packard.*

S. Mateo Co.. California. It is apparently congeneric with my *Emmelesia phasma* from Japan, an insect bearing considerable resemblance to *E. albulata* of Europe: the latter, notwithstanding its similarity in size, general form and coloration, differs not a little in neuration, the discoidal cell of the secondaries being altogether smaller and the bifurcation of the sub-costal vein much shorter.

EUPITHECIA CRETACEATA. *Packard.*

Summit of the Sierra Nevada. From its great size this species might readily be mistaken for a *Lobophora*, but its structure agrees better with *Eupithecia.*

PLEMYRIA FLUVIATA. *Hübner.*

Two examples. California. New to the collection.

OCHYRIA RUBRO-SUFFUSATA. *Packard.*

Two examples. Havilah, California. This type of coloration is new to me as associated with *Coremia* (to which genus *Ochyria* seems closely allied) it is rather characteristic of *Fidonia;* but in *Ochyria* one looks in vain for the broad plumose antennæ of that genus.

TRIPHOSA PROGRESSATA? *Walk.*

Triphosa dubitata, Packard (non Linn.)

Mendocino, California.

The insect sent by Mr. Edwards agrees in size and general pattern with Packard's figure, but not at all with European specimens of *T. dubitata;* the latter have grey secondaries, with the markings very faintly indicated. The primaries are altogether of a duller color, with the central belt much broader. I doubt the occurrence of *T. dubitata* in America. The example before me is, I believe, a slight variety of Walker's *Scotosia progressata*, from St. Domingo.

PETROPHORA PRUNATA. var. nubilata. *Packard.*

Oregon and Knight's Valley, California. It is allied to "*Cidaria*" *suffumata* of Europe and *C. Pryeri* of Japan.

EUBOLIIDÆ.

CHESIAS OCCIDENTALIATA. *Packard.*

One example Marin Co., California. Quite new to me.

This concludes the series presented to us by Mr. Edwards.

JOSEPH DUNCAN PUTNAM.

An earnest student, a devoted lover of science, and a kind and amiable man, has just passed away from earth. Joseph Duncan Putnam died on Dec. 10th, at his home, Davenport, Iowa, and in the city which he honored with the labor of his life, there will scarcely be found one to fill the place he occupied. Though suffering for many years past from that dread disease, consumption, and given over as incurable by many physicians, the marvellous strength of will which he possessed, enabled him to make a powerful struggle against the destroyer, and the work he has accomplished even under the pressure of sickness, has been such as few strong and healthy men could have given to the world. He was born at Jacksonville, Ill., in 1855, and was therefore, only 26 years of age at his untimely death.

"At the age of 10 or 11 years he began collecting fossils, minerals, plants, shells and insects, but gradually narrowed down the scope of his intellect, if the statement may be permitted, to the department of entomology. In 1872 he accompanied Dr. C. C. Parry to Colorado, where, during three months spent high up in the mountains, large collections were made in various departments of Natural History. There they were visited by the two eminent botanists, Dr. John Torrey and Dr. Asa Gray. The winter following was spent in hard study. In 1873, again in company with Dr. Parry, he was attached to Capt. Jones' expedition to the Yellowstone, as meteorologist, and carried a barometer for more than 1000 miles on mule back through some of the roughest districts of the Wyoming and the National park. In his reports of this expedition Capt. Jones makes frequent and honorable mention of the deceased, and the important and valuable service which he rendered to the cause of science."

On the founding of the "Davenport Academy of Natural Sciences," in 1867, he was one of its earliest members and devoted himself, heart and soul to the benefit of the society. "On the 28th of April, 1871, he was elected Recording Secretary, a position which he retained until January, 1875, when ill health caused him to resign. He was appointed a member of the Publishing Committee in November, 1875, and Chairman of the same in January, 1877. In November, 1876, he was elected Corresponding Secretary. In the spring of that year he commenced the publication of the proceedings of the Academy, and at the time of his death, he had been for nearly a year President of the Academy, combining with the duties of that office those of Secretary and Editor of the Proceedings." He was essentially a hard worker, too much so, perhaps, for the frail body which enclosed his aspiring and inquiring soul, and in all that he undertook, "thoroughness and truth" was his motto. His papers on *Leucanium acericola, W. and R.* (the Maple barklouse) are valuable contributions to entomology; while his researches into the life-history and classification of the singular Arachnid family, *Solpugidæ*, if he had lived to publish them, would have made his name famous wherever science is known. It is not many months since, that he spent several days in the libraries of New York and Boston, in searching for literature upon this little known group of animals, and it is to be hoped that he has left behind him some MSS. upon this subject. which may yet see the light.

Mr. Putnam was early elected a Corresponding Member of the N. Y. Entom. Club, and manifested the warmest interest in its success, the state of his health and his constant occupation being the only obstacles to his frequent contributions to our columns. He died, as he had lived, full of hope, an earnest, brave, and gentle soul, animated by kindness for all, and leaving behind him none but those who admired his character, and who love and honor his memory.

HY. EDWARDS.

Pl.1.

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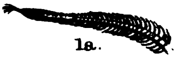
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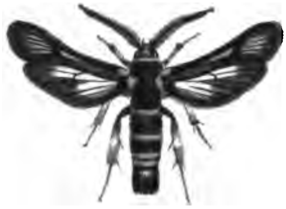
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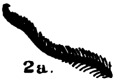
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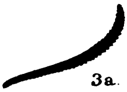
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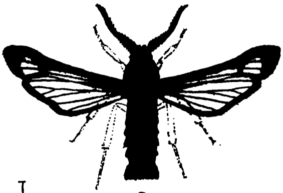
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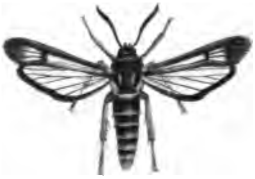
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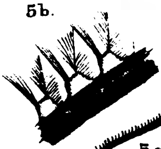
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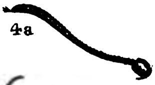
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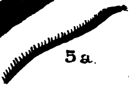
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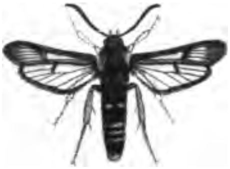
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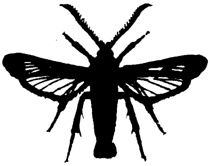
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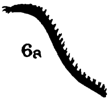
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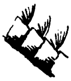
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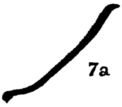
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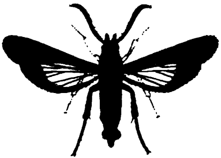
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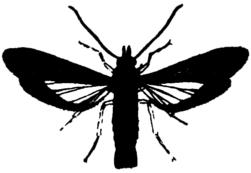
7

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1. 1^a.	*Ægeria*	*emphytiformis*	Walk.
2. 2^a.	"	*pleciæformis*	"
3. 3^a.	"	*odyneripennis*	"
4. 4^a.	"	*hylotomiformis*	"
5. 5^a 5^b.	"	*pyramidalis*	"
6. 6^a 6^b.	"	*sapygæformis*	"
7. 7^a.	"	*geliformis*	"

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It has been found impossible to prepare the Index and Corrigenda for the present number, but they, together with the title page of Vol. 1, (which is complete with the present month,) will be forwarded with the first No. of Vol. 2., in January. Intending subscribers are requested to send in their names as early as possible. Several new features will appear in the 2d Volume.

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ERRATA ET CORRIGENDA.

Page 3, line 31, substitute "r" for "R" in 3rd word.
" 5, " 36, for "Catacola" read "Catocala."
" 6, " 40, after "proceeds" insert "one."
" 7, " 38, for "imagoes" read "imagos."
" 8, " 5, " " " "
" 8, " 15, " " " "
" 8, " 22, " " " "
" 10, " 31, for "Wissfield" read "Wittfeld."
" 13, " 8, substitute "n" for "N" in 3rd word.
" 14, " 2, for "imagoes ', read "imagos."
" 15, " 35, for "ochery" read "ochrey."
" 16, " 4, ' " " "
" 19, " 6, in "marking" add "s."
" 20, " 7, for "crimson" read "cinnamon."
" 24, " 15, for "concolorus" read "concolorous."
" 26, " 3, after "1" add "♂."
" 26, " 18, for "♂" substitute "♀."
" 29, " 20, for "latten" read "latter."
" 30, " 12, for "imagoes" read "imagos."
" 30, " 28, for "habital" read "habitat."
" 30, " 35, for "Pieni" read "Pieris."
" 30, " 35, for "Ilaiare" read "Ilaire."
" 35, " 27, add a comma after "Colias."
" 35, " 34, for "Scequoilus" read "Sequoiolus."
" 38, " 41, for "primiaries" read "primaries."
" 40, " 36, for "imagoes" read "imagos."
" 41, " 39, for "I. R. Pilate" read "G. R. Pilate."
" 43, " 5, for "Peridiceas" read "Perdiocas."
" 43, " 15, for "grayish" read "yellowish."
" 44, " 8, for "Perdiceas" read "Perdiccas."
" 51, " 17, for "Crensa" read "Creusa."
" 53, " 10, substitute "t" for "T."
" 58, " 7, add "and" between "Lilacina" and "Legitima."
" 59, " 11, for "as" read "a."
" 59, " 12, for "Hadeva" read "Hadena."
" 59, " 25, dele "semilunata."
" 70, " 2 of foot note, for "spot's" read "spots."
" 71, " 30, for "Iuvenals" read "Juvenalis."
" 72, " 4, dele "in the Middle and Eastern States."
" 72, " 22, after "met with" add "in the Middle and Eastern States.
" 73, " 4, for "Cæspitabis" read "cæspitatis."
" 73, " 4, dele foot note of the page.
" 81, " 19, for "L. pholu" read "L. pholus."
" 94, " 6, for "sometime" read "sometimes."
" 99, " 31, 1st column dele "Napææ," and place it in 2d column thus

EUROPEAN
SUMMER FORMS.
3 Napææ. (Europe.)

Page 100, line 28, for "♀" substitute "♂."
" 100, " 29, for "♂" substitute "♀."

Page 104, line 16, for "Amphelophaga" read "Ampelophaga."
" 104, " 23, for "represnt read "represent."
" 105, " 45, for "Cauthetia" read "Cautethia."
" 111, " 34, 1st col., for "Dimeter" read "Demeter."
" 112, " 41, 1st col., for "Lemoniid" read "Lemoniidæ."
" 112, " 43, 1st col., for "Libythæa" read "Libythea."
" 112, " 47, 1st col., for "Isopthalma" read "Isophthalma."
" 113, " 18, 1st col., for "Villersi" read "Villiersi."
" 113, " 35, 1st col., for "Marmorea" read "Marmorosa."
" 113, " 39, 1st col., for "Hoppfer" read "Hopffer."
" 113, " 41, 1st col., for "Achylodes" read "Achlyodes."
" 113, " 21' 2nd col., for "Mayo" read "Mago."
" 113, " 22, 2nd col., for " " "
" 113, " 24, 2nd col., for " " "
" 113, " 44, 2nd col., for " " "
" 113, " 40, 2nd col., for "Cuxana" read "Cunaxa,"
" 113, " 48, 2nd col., for "Syricthus" read "Syrictus."
" 113, " 58, 2nd col., after "Zephodes" dele "Cr." and put in "Hubn."
" 114, " 6, for "Achylodes" read "Achlyodes."
" 114, " 24, for "Pasco" read "Paseo."
" 114, " 34, for "Amnon" read "Ammon."
" 114, " 35, for "Astinida" read "Astenida."
" 114, " 36, for " " "
" 114, " 37, for "Sumadus" read "Sumadue."
" 114, " 39, for "Endamus" read "Eudamus."
" 114, " 43, for "Jaqua" read "Jagua."
" 114, " 44, for "Nisoniadus" read "Nisoniades."
" 115, " 18, for "Libocedrus" read "Libocedri."
" 129, " 42, reverse "p" in "Gnophæla."
" 132, " 17, for "Endamus" read "Eudamus."
" 141, " 16, for "thoacic" read "thoracic."
" 142, " 32, for "thich" read "thick."
" 155, " 44, for "ocher" read "ochre."
" 156, " 45, for "Stecker" read "Strecker."
" 157, " 19, for " " "
" 161, " 44, for "to far" read "too far."
" 163, " 22, for "Uniguga" read "Unijuga."
" 163, " 40, for " " "
" 169, " 15, for "coccoon" read "cocoon."
" 172, " 16, for "stigmota" read "stigmata."
" 172, " 30, for "other" read "others,"
" 175, " 35, for "ochery" read "ochrey."
" 176, " 45, for "Copidryus" read "Copidryas."
" 182, " 17, for "obselete" read "obsolete,"
" 185, " 31, for "8 m. m." read "16 m. m."
" 188, " 38, after "Exp. wings" add "24 m. m."
" 189, " 32, for "tipulifornis" read "tipuliformis."
" 201, " 20, for "margin" read "margins."
" 204, " 25, for "opposite" read "between the eye and the light."

NOTE.—Subscribers are requested to notice that the whole of the paper on Thecla Henrici, by W. H. Edwards, p. p. 150, 151, 152, has been reprinted, and forwarded with No. 11. The corrected copy should be inserted in the place of that in the body of the work.

EXPLANATION OF PLATES.

PLATE I.

Edwardsia Brillians. NEUM.

PLATE 2 AND 3.

WINTER FORMS,

EUROPEAN.

1.	*Bryoniæ* (Alps)	♀
2.	*Napi* (Germany)	♂

AMERICAN.

4.	*Bryoniæ* (Newfoundland)	♀
5.	*Hulda* (Alaska, &c.)	♀
6.	*Venosa* (California)	♂
7.	" "	♀
8.	*Oleracea hyemalis* (New York)	♂
9.	*Borealis* (Anticosti)	♂

SUMMER FORMS.

EUROPEAN.

3.	*Napææ*	♀

AMERICAN.

10.	*Acadica* (Newfoundland	♂
11.	" "	♀
12.	*Pallida* (Vancouver's Island)	♂
13.	" " "	♀
14.	*Castoria* (California)	♂
15.	*Oleracea æstiva* (New York)	♂
16.	" " "	♂
17.	*Virginiensis* (Coalburgh, W.Va.	♀
18.	" " "	♂

PLATE 4.

1. 1^a	*Ægeria*	*emphytiformis*	Walk.
2. 2^a	"	*pleciæformis*	"
3. 3^a	"	*odyneripennis*	"
4. 4^a	"	*hylotomiformis*	"
5. 5^a 5^b	"	*pyramidalis*	"
6. 6^a 6^b	"	*sapygæformis*	"
7. 7^a	"	*geliformis*	"

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